Data Evaluation Report on the effects of saflufenacil on *Typhlodromus pyri*

PMRA Submission Number: 2008-0430 **MRID#: 474308-03**

PMRA# for DER: 1604191 **PMRA# for original study: 1599144**

Data requirement	**TGAI**
PMRA Data Code:	9.2.5
EPA DP Barcode:	349851
OECD Data Point:	IIA 8.8.1.2
EPA Guideline:	n/a
OPPTS Guideline:	n/a

Test material: **BAS 800 01 H** **Guarantee:** 70.0% BAS 800 H

Active ingredient: saflufenacil

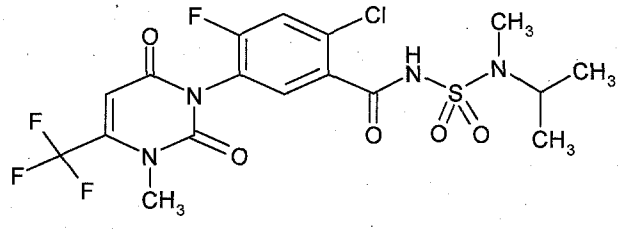
IUPAC: N'-[2-chloro-4-fluoro-5-(3-methyl-2,6-dioxo-4-(trifluoromethyl)-3,6-dihydro-1(2H)-pyrimidinyl)benzoyl]-N-isopropyl-N-methylsulfamide

CAS name: 2-chloro-5[3,6-dihydro-3-methyl-2,6-dioxo-4-(trifluoromethyl)-1(2H)-pyrimidinyl]-4-fluoro-N-[(methyl(1-methylethyl)amino]sulfonyl]-benzamide

CAS No.: 372137-35-4

Synonyms: BAS 800 H

Structural formula:



Primary Reviewer: Janine Glaser (1009) **Date:** 2008-Aug-15
Canada-HC-PMRA-EAD

Secondary Reviewers: Anita Pease **Date:** 2009-Jun-09
United States-EPA-OPP-EFED-ERB4

Farzad Jahromi **Date:** 2008-Dec-17
Australia-DEWHA-CAS

PMRA Company Code	BAZ
PMRA Active Code	SFF
PMRA Use Site Category	13, 14
EPA PC Code	118203

CITATION: Sipos K. 2008. Effects of BAS 800 01 H on the predatory mite (*Typhlodromus pyri*). 2008-Apr-30. BASF-2008/1013694; MRID-474308-03; PMRA-1599144.

EXECUTIVE SUMMARY

The effects of the water-dispersible granule BAS 800 01 H (70% saflufenacil) on mortality of the predatory mite (*Typhlodromus pyri*) were determined. Twenty protonymphs per replicate were exposed to dried residues on glass plates at rates of 11, 33, 100, 300, and 900 g product/ha (7.7, 23, 70, 210, and 630 g a.i./ha) over a period of 7 days. In addition, deionised water as control and a toxic reference (dimethoate, 395.9 g/l) at 15 mL product/ha were tested. The test was conducted with 3 replicates per rate (5 replicates for control). Mortality was used to determine the endpoint. The 7d LR50 value was 647 g product/ha (453 g a.i./ha).

This study is classified as **FULLY RELIABLE** to PMRA and APVMA and **SUPPLEMENTAL** to EPA (data are not required for registration in the USA). The results are suitable for use in regulatory risk assessment.

Results Synopsis

Test organism:	*Typhlodromus pyri* protonymphs
7d LR50:	647 g product/ha (453 g a.i./ha)
% deviation from control for reproductive endpoint:	not determined

I. MATERIALS AND METHODS

Guideline: IOBC/OILB 2000 (Blümel et al., pp 121-143)
GLP: yes (certified laboratory)
Testing facility: LAB Research Ltd, Szabadságpuszta, Veszprém, Hungary
Dates of work: 2008-Apr-18 to 2008-Apr-30
Deviations: Test was performed without the reproduction phase

A. Test substance

Name:	BAS 800 01 H
Type of formulation:	WG (water dispersible granule)
Batch No.:	1641-87
Expiry date:	2009 Sep 12
Content:	68.8% saflufenacil (analysed)

Table 1: Physical and chemical properties of active substance

Parameter	Value		
Water solubility	pH 4 0.0014 g/100 mL pH 5 0.0025 g/100 mL pH 7 0.21 g/100 mL pH 9 not determined due to degradation		
Vapour pressure	4.5×10^{-15} Pa at 20°C 2.0×10^{-14} Pa at 25°C		
UV absorption	pH	1.12	6.94
	λ_{max} (nm)	271.8	271.4
	ε (L/mol-cm)	9539	9708
pK_a	4.41		
log K_{ow}	2.6		

B. Toxic reference

Identification code: BAS 152 11 I
Active ingredient: Dimethoate
Analysed content: 395.9 g/l
Type of formulation: emulsifiable concentrate

C. Test organisms

Species: *Typhlodromus pyri*
Common name: predatory mite
Age: protonymphs, <24 hours after moulting
Source: Katz Biotech AG, Welzheim, Germany

D. Design of biological test

Twenty protonymphs were exposed to dried residues of BAS 800 01 H in a standard laboratory test in a 2-dimensional (open) test system on glass plates over a period of 7 days. The test item was applied at rates of 11, 33, 100, 300, and 900 g product/ha (7.7, 23, 70, 210, and 630 g a.i./ha) with a water volume of 200 L/ha. In addition, deionised water as control and a toxic reference (dimethoate, 395.9 g/l) at 15 mL product/ha were tested. One unit consisted of two cover slides (glass, 20×60 mm) which were fixed together by a glass bar glued (inert epoxy glue) in the horizontal direction. This set-up served as one exposure unit (replicate) in which 20 protonymphs were released at test start. The test was conducted with 3 replicates per rate (5 replicates for control). The food provided to the mites was pine pollen, which was supplied approximately every 3 days.

D. Observation and measurements

After application, the actual applied water volume was assessed by re-weighing Petri-dishes. Mortality (including number of escapees) was assessed at 1, 3, and 7 days after application. Light intensity was measured once at the beginning of the test. The temperature and relative humidity were continuously measured and checked each weekday.

II. RESULTS

A. Physical and chemical parameters

Test temperature: 24.6-26.2°C
Relative air humidity: 60-88%
Photoperiod: 16 hours light/ 8 hours dark
Light intensity: 911.0 lux

B. Verification of the application volume

Re-weighing of Petri-dishes after the application revealed that 200 L/ha was applied.

C. Biological findings

Effects on mortality are listed as follows:

Table 2: Effects of BAS 800 01 H on mortality of *Typhlodromus pyri* after 7 days

Treatment	g product/ha	% mean mortality (uncorr.)	% mean mortality (corr.)
control	0	11.00	—
Test item	11	36.67	28.84
Test item	33	41.67	34.46
Test item	100	45.00*	38.20
Test item	300	48.33*	41.95
Test item	900	60.00*	55.06
Reference item	15 mL product/ha	91.67*	90.64

*statistically different to the control (ANOVA, Bonferroni t-test, α=0.05)

Statistical analysis of trial results to detect significant differences was not verified by the Regulatory Authority since they are not used to determine the key regulatory endpoint.

D. Test with toxic reference substance

The reference item was dimethoate (395.9 g/l analysed) and was applied under the same test conditions at 15 mL/ha (3 replicates). The cumulative mean mortality of mites exposed to the reference item after 7 days was within the expected limits of 50-100% (M_{corr} = 90.64%). Thus, the test with toxic reference substance demonstrates the sensitivity of the test system.

E. Validity criteria

The validity criterion of 7d control mortality <20% is fulfilled. The validity criterion regarding the performance of the toxic reference is fulfilled.

F. Biological endpoints derived

From the results presented above, the following biological endpoint was derived from the study author:

7d LR50: 647 g product/ha (453 g a.i./ha)
95% CI: 136-3078 g product/ha (95-2155 g a.i./ha)
Analysis: Probit regression

The derived endpoint was verified by the Regulatory Authority by plotting the probit of mean corrected mortality versus log concentration in SigmaPlot; therefore, the endpoint derived from the study author is acceptable and was retained.

Reguatory Authority analyses:

Probit of corrected replicate mortality versus log concentration
$y = 3.8815 + 0.4036x$ (r^2 0.24)
LC50 591 g product/ha

Probit of corrected mean mortality versus log concentration
$y = 4.0787 + 0.3276x$ (r^2 0.93)
LC50 649 g product/ha

III. STUDY DEFICIENCIES

Effects on reproduction were not determined. However, the Regulatory Authority accepts the deviation on the basis that a Tier 1 risk assessment indicates that there are no concerns about the use of saflufenacil affecting predatory arthropod species (in- or off-field). The in-field RQ values do not exceed the level of concern (LOC 2.0).

Table 3: Tier 1 risk assessment of water-dispersible granule BAS 800 01 H (70% saflufenacil) on *Typhlodromus pyri*

Risk assessment parameter	Canada	USA	Australia
EEC (g saflufenacil/ha)	100	400	3×24 =72
LR50 (g saflufenacil/ha)	453	453	453
RQ (EEC / LR50)	0.22	0.88	0.16

V. CONCLUSIONS

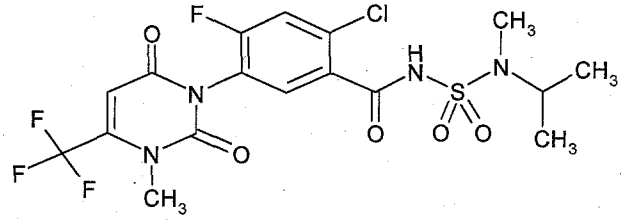
This study is classified as **FULLY RELIABLE** to PMRA and APVMA and **SUPPLEMENTAL** to EPA (data are not required for registration in the USA). The study appears to have been well conducted and reported. The results are suitable for use in regulatory risk assessment. The 7d LR50 value was 647 g product/ha (453 g a.i./ha).

Data Evaluation Report on the effects of saflufenacil and dimethenamid-p on *Typhlodromus pyri*
PMRA Submission Number: 2008-0432 **MRID#: 47523902**
PMRA# for DER: 1636087 **PMRA# for original study: 1633869**

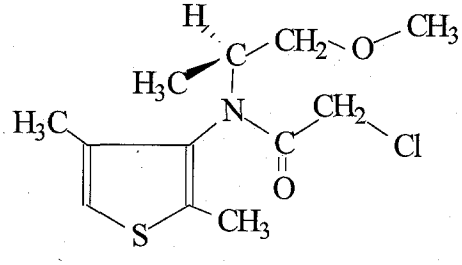
Data requirement
PMRA Data Code: 9.2.5
EPA DP Barcode: 349851
OECD Data Point: IIA 8.8.1.2
EPA Guideline: n/a
OPPTS Guideline: n/a

Test material: **BAS 781 02 H** **Guarantee:** 6.1% BAS 800 H (saflufenacil)
53.6% BAS 656 H (dimethenamid-p)

Active ingredient: saflufenacil
IUPAC: N'-[2-chloro-4-fluoro-5-(3-methyl-2,6-dioxo-4-(trifluoromethyl)-3,6-dihydro-1(2H)-pyrimidinyl)benzoyl]-N-isopropyl-N-methylsulfamide
CAS name: 2-chloro-5[3,6-dihydro-3-methyl-2,6-dioxo-4-(trifluoromethyl)-1(2H)-pyrimidinyl]-4-fluoro-N-[(methyl(1-methylethyl)amino]sulfonyl]-benzamide
CAS No.: 372137-35-4
Synonyms: BAS 800 H
Structural formula:



Active ingredient: dimethenamid-p
IUPAC: (S)-2-chloro-N-(2,4-dimethyl-3-thienyl)-N-(2-methoxy-1-methoxy-1-methylethyl) acetic acid
CAS name: 2-chloro-N-(2,4-dimethyl-3-thienyl)-N-((1S)-2-methoxy-1-methylethyl) acetamide
CAS No.: 163515-14-8
Synonyms: BAS 656 H
Structural formula:



Primary Reviewer: Janine Glaser (1009) **Date:** 2008-Sep-11
Canada-HC-PMRA-EAD

Secondary Reviewers: Anita Pease **Date:** 2009-Jun-09
United States-EPA-OPP-EFED-ERB4

Apease
6/9/09

PMRA Company Code	BAZ
PMRA Active Code	SFF (saflufenacil), DMN (dimethenamid-p)
PMRA Use Site Category	13, 14
EPA PC Code	118203 (saflufenacil), 120051 (dimethenamid-p)

CITATION: Waterman L. 2008. A rate-response laboratory test to determine the effects of BAS 781 02 H on the predatory mite, *Typhlodromus pyri* (Acari: Phytoseiidae). 2008-Aug-8. BASF-2008/1036408; MRID-47523902; PMRA-1633869.

EXECUTIVE SUMMARY

The effects of the emulsifiable concentrate BAS 781 02 H (6.1% saflufenacil, 53.6% dimethenamid-p) on mortality of the predatory mite (*Typhlodromus pyri*) were determined. Twenty protonymphs per replicate were exposed to dried residues on glass plates at rates of 8.4, 21.0, 52.5, 131.1, 327.9, and 819.7ml product/ha (0.512, 1.28, 3.2, 8, 20, 50g saflufenacil/ha; 4.50, 11.26, 28.14, 70.27, 175.75, and 439.36g dimethenamid-p/ha) over a period of 7 days. In addition, deionised water as control and a toxic reference (dimethoate, 400 g/l) at 15 mL product/ha were tested. The test was conducted with 3 replicates per rate (5 replicates for control). Mortality was used to determine the endpoint. The 7d LR50 value was 284ml product/ha (17g saflufenacil/ha; 152g dimethenamid-p/ha).

This study is classified as **FULLY RELIABLE** to PMRA and **SUPPLEMENTAL** to EPA (data are not required for registration in the USA). The results are suitable for use in regulatory risk assessment. However, a Tier 1 in-field risk assessment indicates that higher tier testing should have been conducted (the in-field RQ values exceed the level of concern (LOC 2.0), Table 1). A refined assessment considering the use pattern (pre-emergent application and pre-plant incorporation) assumes foliar interception of 0% and soil deposition of 100%. Therefore, testing on ground dwelling species should be conducted for a refined assessment (such as predatory ground beetle *Poecilus cupreus* or rove beetle *Aleochara bilineata* or spider *Pardosa*).

Table 1: Tier 1 risk assessment of emulsifiable concentrate BAS 781 02 H (6.1% saflufenacil, 53.6% dimethenamid-p) on *Typhlodromus pyri*

Risk assessment parameter	Canada	USA
EEC	75 g saflufenacil/ha	0.24 lb saflufenacil/A
LR50	17 g saflufenacil/ha	0.0015 lb saflufenacil/A
RQ (EEC / LR50)	4.4	17

Results Synopsis

Test organism: *Typhlodromus pyri* protonymphs
7d LR50: 284ml product/ha (19g saflufenacil/ha; 169g dimethenamid-p/ha)

% deviation from control

for reproductive endpoint: not determined

I. MATERIALS AND METHODS

Guideline: IOBC/OILB 2000 (Blümel et al., pp 121-143)
GLP: yes (certified laboratory)
Testing facility: LAB Research Ltd, Szabadságpuszta, Veszprém, Hungary
Dates of work: 2008-Jun-27 to 2008-Aug-5
Deviations: Test was performed without the reproduction phase

A. Test substance

Name: BAS 781 02 H
Type of formulation: EC (emulsifiable concentrate) formulation
Batch No.: 1632-78
Expiry date: 2009 Oct 5
Content: 6.2% saflufenacil, 54.6% dimethenamid-p (analysed)
Density: 1.0901 g/ml

Table 2: Physical and chemical properties of active substances

Parameter	Saflufenacil			Dimethenamid-p
Water solubility	pH 4 0.0014 g/100 mL pH 5 0.0025 g/100 mL pH 7 0.21 g/100 mL pH 9 not determined due to degradation			1449 ± 17 mg/l at 25°C
Vapour pressure	4.5×10^{-15} Pa at 20°C 2.0×10^{-14} Pa at 25°C			1.88×10^{-5} mm Hg at 25°C
UV absorption	pH λ_{max} (nm) ε (L/mol-cm)	1.12 271.8 9539	6.94 271.4 9708	λ_{max} 236 nm at pH <2, 7 & >10. No absorption at 300-750 nm.
pK_a	4.41			No dissociable groups present
log K_{ow}	2.6			1.89

B. Toxic reference

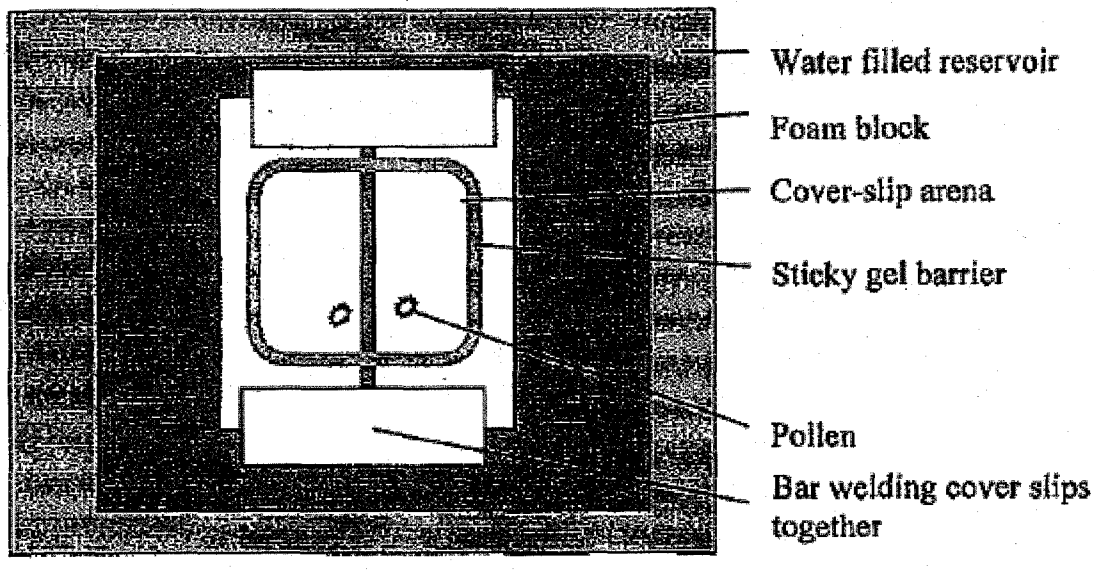
Identification code: BAS 152 11 I
Active ingredient: Dimethoate
Analysed content: 395.9 g/l
Type of formulation: emulsifiable concentrate

C. Test organisms

Species: *Typhlodromus pyri*
Common name: predatory mite
Age: protonymphs, <24 hours after moulting
Source: P.K Nützlingszuchten, Welzheim, Germany

D. Design of biological test

Twenty protonymphs were exposed to dried residues of BAS 781 02 H in a standard laboratory test in a 2-dimensional (open) test system on glass plates over a period of 7 days. The test item was applied at rates of 8.4, 21.0, 52.5, 131.1, 327.9, and 819.7ml product/ha (0.512, 1.28, 3.2, 8, 20, 50g saflufenacil/ha; 4.50, 11.26, 28.14, 70.27, 175.75, and 439.36g dimethenamid-p/ha) with a water volume of 200 L/ha. In addition, deionised water as control and a toxic reference (dimethoate, 400 g/l) at 15 mL product/ha were tested. One unit consisted of two cover slides (glass, 22×40 mm) which were fixed together by additional cover-slips glued to the top and bottom ends. After treatment, a 12 cm^2 arena was created with "non-drying insect glue". This set-up served as one exposure unit (replicate) in which 20 protonymphs were released at test start. The test was conducted with 3 replicates per rate (5 replicates for control). The food provided to the mites was 1:1 v/v mixture of almond and apple pollen, which was replenished daily.



D. Observations and measurements

Mortality (including number of escapees) was assessed at 1 and 7 days after application. Light intensity was measured once at the beginning of the test. The temperature and relative humidity were measured each hour.

II. RESULTS

A. Physical and chemical parameters

Test temperature:	25-26°C
Relative air humidity:	51.8-86%
Photoperiod:	16 hours light/ 8 hours dark
Light intensity:	330-1230 lux

B. Verification of the application volume

The sprayer was calibrated in advance of treatment by weighing spray deposits until two consecutive applications had delivered 200 L/ha (2 mg deposit/cm^2).

C. Biological findings

Effects on mortality are listed as follows:

Table 3: Effects of BAS 781 02 H on mortality of *Typhlodromus pyri* after 7 days

Treatment	ml product/ha	% mean mortality (uncorr.)	% mean mortality (corr.)
control	0	12.0	—
Test item	8.4	11.7	-0.3
Test item	21.0	16.7	5.3
Test item	52.5	21.7	11.0
Test item	131.1	25.0*	14.8
Test item	327.9	63.3*	58.3
Test item	819.7	83.3*	81.0
Reference item	15 mL product/ha	95.0*	94.3

*statistically different to the control (Fisher's Exact Test, α=0.05)

Statistical analysis of trial results to detect significant differences was not verified by the Regulatory Authority since they are not used to determine the key regulatory endpoint.

D. Test with toxic reference substance

The reference item was dimethoate (395.9 g/l analysed) and was applied under the same test conditions at 15 mL/ha (3 replicates). The cumulative mean mortality of mites exposed to the reference item after 7 days was within the expected limits of 50-100% (M_{corr} = 94.3%). Thus, the test with toxic reference substance demonstrates the sensitivity of the test system.

E. Validity criteria

The validity criterion of 7d control mortality <20% is fulfilled. The validity criterion regarding the performance of the toxic reference is fulfilled.

F. Biological endpoints derived

From the results presented above, the following biological endpoint was derived by the study author:

7d LR50: 284ml product/ha (17g saflufenacil/ha; 152g dimethenamid-p/ha)
95% CI : 151-772ml product/ha (9.2-47g saflufenacil/ha; 81-414g dimethenamid-p/ha)
Analysis: Probit regression

Regression coefficent: 1.376 (SE 0.062)
Intercept of probit line: -3.377 (SE 0.139)
Goodness of fit (χ^2): 385 with 16 d.f. (p<0.001)

The derived endpoint was verified by the Regulatory Authority by plotting the probit of mean

corrected mortality versus log concentration in SigmaPlot; therefore, the endpoint derived from the study author is acceptable and was retained.

Regulatory Authority analyses:

Probit of corrected replicate mortality versus log concentration
$y = 2.3905 + 1.1321x$ (r^2 0.75)
LR50 202ml product/ha

Probit of corrected mean mortality versus log concentration
$y = 1.017 + 1.6164x$ (r^2 0.93)
LR50 291ml product/ha

To convert the test rates and LR50 value to a.i.-equivalent rates, the study author used nominal content values and a product density of 1 g/ml. Using measured content values and measured product density of 1.09 g/ml does not significantly alter the a.i.-equivalent LR50 values. Therefore, the saflufenacil equivalent LR50 reported by the study author was retained, and the Regulatory Authority used the same method to obtain the dimethenamid-p-equivalent LR50.

III. STUDY DEFICIENCIES

The relative humidity dropped below the intended minimum threshold (60%) twice, but on these occasions it was for a period of less than 2 hours, and so it was not considered to be a deficiency.

Effects on reproduction were not determined. However, a Tier 1 in-field risk assessment indicates that higher tier testing should have been conducted (the in-field RQ values exceed the level of concern (LOC 2.0), Table 4). A refined assessment considering the use pattern (pre-emergent application and pre-plant incorporation) assumes foliar interception of 0% and soil deposition of 100%. Therefore, testing on ground dwelling species should be conducted for a refined assessment (such as predatory ground beetle *Poecilus cupreus* or rove beetle *Aleochara bilineata* or spider *Pardosa*).

Table 4: Tier 1 risk assessment of emulsifiable concentrate BAS 781 02 H (6.1% saflufenacil, 53.6% dimethenamid-p) on *Typhlodromus pyri*

Risk assessment parameter	Canada	USA
EEC	75 g saflufenacil/ha	0.24 lb saflufenacil/A
LR50	17 g saflufenacil/ha	0.0015 lb saflufenacil/A
RQ (EEC / LR50)	4.4	17

V. CONCLUSIONS

This study is classified as **FULLY RELIABLE** to PMRA and **SUPPLEMENTAL** to EPA (data are not required for registration in the USA). The study appears to have been well conducted and reported. The results are suitable for use in regulatory risk assessment. The 7d LR50 value was 284ml product/ha (17g saflufenacil/ha; 152g dimethenamid-p/ha).

A Tier 1 in-field risk assessment indicates that higher tier testing should have been conducted (the in-field RQ values exceed the level of concern (LOC 2.0), Table 4). A refined assessment considering the use pattern (pre-emergent application and pre-plant incorporation) assumes foliar interception of 0% and soil deposition of 100%. Therefore, testing on ground dwelling species should be conducted for a refined assessment (such as predatory ground beetle *Poecilus cupreus* or rove beetle *Aleochara bilineata* or spider *Pardosa*).